AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1. (Currently Amended) A switched reluctance electric machine comprising:

a stator including a plurality of circumferentially-spaced stator segment assemblies that include a stator segment core and winding wire that is wound around said stator segment core ~~and that defines~~ using a precise winding method to provide substantially uniform inductance and resistance characteristics, wherein said windings define a slot fill that is greater than 65%;

a rotor defining a plurality of rotor poles, wherein said rotor tends to rotate relative to said stator to maximize the inductance of an energized winding; and

a sensorless drive circuit that derives rotor position based on parameters that relate to at least one of said substantially uniform inductance and resistance characteristics of said stator segment assemblies and that energizes said winding wire around said stator segment assemblies to control operation of said switched reluctance machine based on said derived position of said rotor.

2. (Original) The switched reluctance electric machine of claim 1 wherein said sensorless drive circuit includes an inductance sensor that senses inductance of said winding wire of one of said stator segment assemblies wherein said sensorless drive circuit derives said rotor position from said sensed inductance.

3. (Original) The switched reluctance electric machine of claim 1 wherein said sensorless drive circuit includes a diagnostic pulse generator that generates a diagnostic pulse that is output to said winding wire of one of said stator segment assemblies, wherein said sensorless drive circuit derives said rotor position based on a sensed change in phase current due to said diagnostic pulse.

4. (Original) The switched reluctance electric machine of claim 1 wherein said sensorless drive circuit determines rotor position by monitoring a slope of a current waveform related to current flowing in said energized winding and by identifying when said slope is zero.

5. (Original) The switched reluctance electric machine of claim 1 wherein said sensorless drive circuit monitors current and flux and employs a look up table to determine said derived position of said rotor.

6. (Original) The switched reluctance electric machine of claim 1 wherein said stator segment core includes stator plates with an outer rim section and a tooth section that extends radially inwardly from a center portion of said outer rim section.

7. (Original) The switched reluctance electric machine of claim 6 further comprising:

an insulation layer located between said winding wire and said stator segment core.

8. (Original) The switched reluctance electric machine of claim 1 further comprising:

projections extending from opposite sides of a radially inner end of said tooth section.

9. (Original) The switched reluctance electric machine of claim 8 further comprising:

first and second end caps connected to opposite axial ends of said stator segment core; and

first and second end cap retainer sections that extend adjacent to said projections and that connect said first and second end caps,

wherein said first and second end caps and said first and second end cap retainer sections define an annular retention channel that reduces movement of said winding wire during use.

10. (Original) The switched reluctance electric machine of claim 6 wherein said stator plates of said stator segment core include radial and lateral slits and first and second central portions that are deformed to hold said stack of stator plates together.

11. (Currently Amended) A sensorless switched reluctance electric machine comprising:

a stator;

a rotor;

a machine housing;

a plurality of circumferentially-spaced stator segment assemblies that are arranged around an inner surface of said machine housing;

said stator segment assemblies defining a salient stator pole that extends in a radially inward direction;

said stator segment assemblies including a stator segment core and winding wire that is wound around said stator segment core ~~and that defines~~ using a precise winding method to provide substantially uniform inductance and resistance characteristics, wherein said windings define a slot fill that is greater than 65%; and

a sensorless drive circuit that is connected to said winding wire, that derives rotor position based on parameters that relate to at least one of said substantially uniform inductance and resistance characteristics of said stator segment assemblies and that energizes said winding wire around said stator segment assemblies to control operation of said switched reluctance machine based on said derived position of said rotor.

12. (Original) The sensorless switched reluctance electric machine of claim 11 wherein said sensorless drive circuit includes an inductance sensor that senses inductance of one of said stator segment assemblies, wherein said sensorless drive circuit derives said rotor position based on said sensed inductance.

13. (Original) The sensorless switched reluctance electric machine of claim 11 wherein said sensorless drive circuit includes a diagnostic pulse generator that

generates diagnostic pulses that are output to one of said stator segment assemblies, wherein said sensorless drive circuit senses changes in phase current resulting from said diagnostic pulses and derives said rotor position therefrom.

14. (Original) The switched reluctance electric machine of claim 11 wherein said sensorless drive circuit determines rotor position by monitoring a shape of a current waveform related to current flowing in said energized winding and by identifying when said slope is zero.

15. (Original) The switched reluctance electric machine of claim 11 wherein said sensorless drive circuit monitors current and flux and employs a look up table to determine said derived position of said rotor.

16. (Original) The sensorless switched reluctance electric machine of claim 11 wherein said stator segment core includes stator plates with a radially outer rim section and a tooth section that extends radially inwardly from said radially outer rim section.

17. (Original) The sensorless switched reluctance electric machine of claim 16 further comprising:

an insulation layer located between said winding wire and said stator segment core.

18. (Original) The sensorless switched reluctance electric machine of claim 16 further comprising:

projections extending from opposite sides of a radially inner end of said tooth section.

19. (Original) The sensorless switched reluctance electric machine of claim 18 further comprising:

first and second end caps connected to opposite axial ends of said stator segment core; and

first and second end cap retainer sections that extend adjacent to said projections and that connect inner ends of said first and second end caps,

wherein said first and second end caps and said first and second axial end cap retainer sections define an annular retention channel that reduces movement of said winding wire during use.

20. (Original) The sensorless switched reluctance electric machine of claim 16 wherein said stator plates of said stator segment core include radial and lateral slits and first and second central portions that are deformed to hold said stator segment core together.

21. (Currently Amended) A sensorless switched reluctance electric machine comprising:

a machine housing;

a rotor that rotates relative to said machine housing;

a stator that is mounted on an inner surface of said machine housing, said stator including a plurality of circumferentially-spaced stator segment assemblies, wherein said stator segment assemblies include a stack of stator plates forming a stator segment core and winding wire that is wound around said stator segment core using a precise winding method to provide substantially uniform inductance and resistance characteristics, wherein said windings define ~~and that defines~~ a slot fill that is greater than 65%, and wherein each of said stator plates has a generally "T"-shaped cross-section, a radially outer rim section, and a tooth section that extends radially inwardly from a center portion of said radially outer rim section; and

a sensorless drive circuit that derives rotor position based on parameters that relate to at least one of said substantially uniform inductance and resistance characteristics of said stator segment assemblies and that energizes said winding wire around said stator segment assemblies to control operation of said switched reluctance machine based on said derived rotor position.

22. (Original) The sensorless switched reluctance electric machine of claim 21 further comprising:

an insulation layer located between said winding wire and said stator segment cores.

23. (Original) The sensorless switched reluctance electric machine of claim 21 further comprising:

projections extending from opposite sides of a radially inner end of said tooth section.

24. (Original) The sensorless switched reluctance electric machine of claim 23 further comprising:

first and second end caps connected to opposite axial ends of said stator segment core; and

first and second end cap retainer sections that extend adjacent to said projections and that connect inner ends of said first and second end caps,

wherein said first and second end caps and said first and second end cap retainer sections define an annular retention channel that reduces movement of said winding wire during use.

25. (Original) The sensorless switched reluctance electric machine of claim 21 wherein said stator plates of said stator segment core include radial and lateral slits and first and second central portions that are deformed to hold said stator segment core together.

26. (Original) The sensorless switched reluctance electric machine of claim 21 wherein said sensorless drive circuit includes an inductance sensor that senses inductance of one of said stator segment assemblies.

27. (Original) The sensorless switched reluctance electric machine of claim 21 wherein said sensorless drive circuit includes a diagnostic pulse generator that generates diagnostic pulses that are output to one of said stator segment assemblies.